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(54) **VISCOSITY STABILIZATION OF
 RADIATION-CURABLE FILLED
 COMPOSITIONS**

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(58) **Field of Search** **522/100, 102, 522/103, 168, 170, 173, 178, 182, 71, 74, 75, 78, 79, 83; 430/269, 280.1, 281.1; 264/401**

(56) **References Cited**

U.S. PATENT DOCUMENTS

3,721,617 A 3/1973 Watt 204/159.11
 4,575,330 A 3/1986 Hull 425/174.4
 5,073,476 A 12/1991 Meier et al. 430/280

5,236,812 A 8/1993 Vassiliou et al. 430/327
 5,783,358 A 7/1998 Schulthess et al. 430/269
 5,807,519 A 9/1998 Suzuki et al. 264/401
 5,863,486 A 1/1999 Ozaki et al. 264/401

FOREIGN PATENT DOCUMENTS

EP 0632111 1/1995
 WO 96/41238 12/1996
 WO 90/01512 2/1990
 WO 90/04211 4/1990
 WO 96/28763 9/1996
 WO 97/16401 5/1997
 WO 97/16466 5/1997

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(57) **ABSTRACT**

The present invention relates to a process for the production of three-dimensional articles by stereolithography using a radiation-curable composition comprising a mixture of at least one cationically polymerizable compound and/or at least one free radical polymerizable compound, at least one filler material and at least one photoinitiator for cationic and/or radical polymerization. An organic viscosity stabilizer material may be brought into contact with the composition to substantially delay or prevent undesirable viscosity increase and subsequently premature polymerization. A filler material is optionally added to the composition in an effective amount to at least delay or prevent a significant increase in viscosity and polymerization. The process is particularly suitable for stabilizing resins in stereolithography baths. The present invention also relates to a cured articles resulting from said process and a process for manufacturing said radiation-curable compositions and stabilized compositions resulting therefrom.

33 Claims, No Drawings